MARINE REVIEW.

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Ships' Earnings—Situation as Regards Freights.

Readers of the REVIEW who keep posted throughout the year on current matters pertaining to lake freights would not be greatly interested in a lengthy review of the market or conditions that have had a bearing on freights during the season just closed. It is well known that a very large portion of the lake fleet of freight vessels under 2,000 tons carrying capacity have made no money, laying aside all reference to the question of depreciation. Owners of all of the steel vessels and the larger class of wooden steamers will divide moderate earnings, probably as much as 6 per cent. in some cases, where repairs and other charges made in prosperous times are not liberally dealt with. In the case of a few of the steel steamers built lately at low cost, like the Kearsarge, I. W. Nicholas and several others, there is little doubt of satisfactory profits over all expenses, but these boats are exceptions, and the same may be said of the steamers of the iron ore companies, which may be operated under special advantages, on account of the dispatch afforded them in port. But there is one important item, even in the case of the steamers of the ore companies, that must be taken into account in considering any profits that have resulted during the past season, and that is the great difference in the value placed on such steamers a year or two years ago and the price at which they might now be duplicated in any of the ship yards. Steel steamers for which $200,000 and over was paid only a short time ago are now being duplicated for $160,000 to $175,000.

Although figures published by the REVIEW last week showed an increase of about 700,000 tons of ore on dock Dec. 1, as compared with the aggregate on the same date a year ago, the returns were not greatly surprising to men in the ore trade, especially when it was considered that the output of Lake Superior mines by water was 7,776,547 tons, or a full million tons more than was expected early in the season. It is known that the Bessemer ores, aside from Mesabis, are well sold up, and the best feature of the situation at present is the active movement of ores to the furnaces. Shipments from Lake Erie ports to the furnace districts have never been more active than at present, which would indicate a continuance of the heavy make of pig iron, notwithstanding weakness in the sales market for pig. A strange feature of the iron trade is weakness in pig iron although the demand for it has been of a steady and urgent kind. Ore sales agents who keep account of what the furnace men are doing say that this weakness is caused by some manufacturers being forced to sell their iron as fast as it is made in order to realize upon it. The stronger concerns are in several instances stocking iron in furnace yards, rather than sell it at present prices, as they look for improvement after the first of the year.

The conditions, then, in the iron trade are not such as to cause any certainty of higher prices for next year's ores, but ore men are all of the opinion that increased labor cost in the mining regions, coupled with a supply of Bessemer from the Mesabi far less than was expected, on account of the very large proportion of non-Bessemer that is mixed with the ore of the new range, will result in an advance of 25 or 50 cents a ton over last year's prices. It would be interesting to know now how much of the unsold ore on dock may be charged to the Mesabi output of 1,793,988 tons during the past season, as figures bringing out this feature of the situation would have an important bearing on the matter of new prices. Statements that are usually made by the sales agents at the close of the year may determine this point.

Ship Yard Matters.

About 1,400,000 tons of iron ore, all from Lake Superior, was handled by the firm of Pickands, Mather & Co., of Cleveland, during the past season. It is not surprising then that this big concern, with the Minnesota company and the several corporations which it represents in the transportation business, should call for bids on a new steel steamer and two consorts, in addition to ten ships already under its control, and two others under construction. This firm's shipments of ore in 1894 are full half a million tons greater than they were in 1893, and with the special advantage given to its boats, through control of docks at both ends of the ore route, there is no doubt of its transportation charges being reduced to a figure at which no outside tonnage could compete for the business. It is understood that according to an outline of plans for the big 400-foot steamer on which lake builders have been asked to submit figures, the boat is to have twelve working hatches and be constructed without a between deck. The matter of letting a contract for the new boats, will be settled in a few days.

The Conneaut-Port Dover car ferries are again talked of in connection with a rumor that the Craig Ship Building Company, of Toledo, has been awarded a contract for them. This contract might be had by any of the lake builders who would take stock in the boats to the extent of $100,000 or more, but it is not probable that the Craig company has gone into the project on any such basis. Mr. Hingston, of the firm of Hingston & Woods, Buffalo, was in Conneaut a few days ago, considering the scheme with Col. Dick, Mr. Blair, and other officers of the Pittsburg, Shenango & Lake Erie Railway, and he had thought of taking an interest in arrangements for the construction of the ferries and the necessary terminals at Conneaut and Port Dover, probably in conjunction with the railway company and the Toledo builders. The owners of the railway at Conneaut are very enthusiastic over the project, but their present plans, with the firms referred to, may amount to no more than previous negotiations with other builders, on account of the big money question involved.

General Manager Newman and other directors of the Cleveland and Buffalo Transit Company, who seemed set on having a side-wheel steamer for the Lake Erie service, have modified their ideas, after consulting some of the builders, and are inclined now to a screw steamer, so that there is reason to look for a magnificent twin-screw ship of 17 or 18 miles speed, on the Cleveland-Buffalo route. It is hardly probable that the kind of boat contemplated by this company can be gotten ready for service before June next.

Mr. F. T. Hodgson, of Collingwood, Ont., directs attention to an error in the list of new contracts printed in the last issue of the REVIEW. The large passenger steamer for which the Great Northern Transportation Company has let a contract, is to be built in Collingwood by the Collingwood Dry Dock and Wrecking Company, and not in Owen Sound. The transportation company is also a Collingwood company. It has its headquarters in that town and all of its steamers are laid up there during the winter.

Out of several prospective contracts, upon which the firm of F. W. Wheeler & Co., of West Bay City, have been figuring, it is understood that one for a steel steamer, is about certain to be closed in a few days. This contract, if secured, will give the Wheeler yard two big boats to be turned out next spring. Work is progressing rapidly on the boat being built for Capt. John Mitchell and others.

The type of passenger boat now talked of for the Graham & Morton company of Chicago is a wooden steamer to cost not more than $60,000. Her dimensions would be about 180 feet keel, 33 feet beam and 14 feet depth. Burger & Burger of Manitowoc have submitted plans and figures on the boat.

Burger & Burger, of Manitowoc, Wis., will build a tug 85 feet long for Leatham & Smith, of Sturgeon Bay. The boat will have a compound engine with cylinders of 15 and 30 inches, by 24 inches stroke and a boiler 8½ feet diameter by 12 feet long.

The Cleveland, Lorain & Wheeling Railway Company will probably build this winter a new tug to care for increasing harbor work at Lorain.

A Forcible Document.

Secretary Keep of the Lake Carriers' Association has prepared for submission to congress a brief covering the whole subject of aids to navigation, for which appropriations are sought at the present session. The brief is addressed to the chairman of the house and senate committees on appropriations, and is one of the most complete and persuasive documents ever sent to Washington from the lakes. It is an admirable summary of the whole matter of appropriations for lights, fog signals, etc., and reflects great credit on work of the secretary. Original copies of it will be signed by President Corrigan, Mr. Keep and Capt. McKay, who is chairman of the committee on aids to navigation.

Chicago's grain fleet now in winter quarters, is the largest ever known. If all the vessels are loaded before the opening of navigation they will carry away 12,800,000 bushels of grain. The fleet consists of one hundred and nine steamers and eighty two schooners and barges. The capacity of twenty of the steamers is more than 100,000 bushels each. Last December the fleet consisted of 207 boats of all kinds, but the aggregate capacity was only 11,269,000 bushels.

Full Report of Sault Canal Traffic, Season of 1894.

Full statistics covering St. Mary's Falls canal traffic for the season of 1894 are at hand, and as anticipated by the monthly summary of returns, provided by Gen. Supt. Wheeler, who is in charge of the canal under Gen. Poe of the army engineer corps, the freight movement through the canal is 2,600,000 tons greater than it was in 1893 and nearly 2,000,000 tons greater than in 1892, the year in which all previous records were surpassed. The freight tonnage of the canal during the past season reached the enormous total of 13,195,860 net tons, the registered tonnage 13,110,366 tons and the number of passages 14,491.

Of course the great bulk of the increase in freight tonnage is due to heavy shipments of iron ore from the new Messabi range of Minnesota, the ore movement through the canal showing an increase of 63 per cent. over 1893. In the opening up of new lumber regions at the head of Lake Superior, the canal business was also increased materially, the lumber shipments being 23 per cent. in excess of the previous year. Flour shipments aggregated 1,545,099 barrels, an excess of 20 per cent. over 1893, but there was a decrease of 20 per cent. in the wheat movement, and in grain other than wheat the decrease amounted to 36 per cent. Notwithstanding the delay early in the season in forwarding coal, the shipments of hard and soft coal together were only 210,039 tons, or 7 per cent., less than in 1893.

COMPARATIVE STATEMENT OF COMMERCE THROUGH ST. MARY'S FALLS CANAL, MICHIGAN, FOR THE SEASONS OF 1893 AND 1894.

ITEMS.	Designation.	SEASON.		INCREASE.		DECREASE.	
		1893.	1894.	Amount.	Per Ct.	Amount.	Per Ct.
Vessels (a)	Number	12,008	14,491	2,483	21		
Lockages	Number	5,553	6,431	878	16		
Tonnage, registered	Net tons	9,849,754	13,110,366	3,260,612	34		
Tonnage, freight	Net tons	10,796,572	13,195,860	2,399,288	22		
Passengers	Number	18,869	27,276	8,367	45		
Coal, hard	Net tons	3,008,120	532,870			210,036	7
Coal, soft	Net tons		2,264,314				
Flour	Barrels.	7,420,694	8,965,773	1,545,099	20		
Wheat	Bushels.	43,481,652	34,869,483			8,612,169	20
Grain (other than wheat)	Bushels.	2,405,344	1,545,008			860,336	36
Manufactured pig iron	Net tons	89,452	60,659			37,793	38
Salt	Barrels.	228,730	237,461	8,731	4		
Copper	Net tons	87,530	99,573	12,043	14		
Iron ore	Net tons	4,014,556	6,548,876	2,534,320	63		
Lumber	M. F. & B. M.	588,545	722,788	134,243	23		
Silver ore	Net tons	2,470	412			2,058	83
Building stone	Net tons	19,426	21,417	1,991	10		
Unclassified freight (b)	Net tons	415,180	451,185	36,005	9		

NOTE (a)—Steamers, 10,208; Sails, 3,676; Unregistered, 607; Total: 14,491.

NOTE (b)—Included in the item of unclassified freight are 1,468 tons of wool and 382 tons of hides. Canal was open to navigation during the season of 1893, 219 days; 1894, 234 days.

TABLE SHOWING ESTIMATED VALUE OF FREIGHT THROUGH ST. MARY'S FALLS CANAL, MICHIGAN, DURING THE SEASON OF 1894.

ITEMS.	Designation.	Quality.	Price Per Unit.	Valuation.
Coal, hard	Net tons	532,870	$ 4 75	$ 2,531,132 50
Coal, soft	Net tons	2,264,314	2 50	5,660,785 00
Flour	Barrels	8,965,773	3 75	33,621,648 75
Wheat	Bushels	34,869,483	64	22,316,469 12
Grain (other than wheat)	Bushels	1,545,008	50	772,504 00
Manufactured iron	Net tons	36,107	50 00	1,805,350 00
Pig iron	Net tons	24,552	13 50	331,452 00
Salt	Barrels	237,461	1 00	237,461 00
Copper	Net tons	99,573	200 00	19,914,600 00
Iron ore	Net tons	6,548,876	2 60	17,027,077 60
Lumber	M. F. & B. M	722,788	16 00	11,564,608 00
Silver ore and bullion	Net tons	412	112 00	46,144 00
Building Stone	Net tons	21,417	10 00	214,170 00
Unclassified freight	Net tons	451,185	60 00	27,071,100 00
				$ 142,114,501 97

NOTE—Average value per ton of freight, $10.85. The units of values used in this table are as amended from those adopted in 1885 and 1892.

On account of a change made in the unit of valuation, the total value of freight this year is not so great as it was in 1893, notwithstanding the increase in the volume of the traffic. The basis of unit values for the valuation of freight has been amended to suit current prices. The amount of the difference caused by this depreciation in the values of the freight is 2 per cent. of last year's valuation, which was based on figures adopted in 1885 and 1892.

Chicago Grain Shipments—Average Grain Freights.

Full reports of the flour and grain movement from Lake Superior are contained in the St. Mary's Falls canal statistics, which are published in another part of this issue. Similar statistics covering grain and flour shipments from Chicago and South Chicago have been prepared from Chicago board of trade reports, and although not as accurate as the figures furnished by the government officers in charge of the St. Mary's Falls canal, they are the most reliable that are to be had at this time. As might be expected from the manner in which the Chicago trade dragged along, without an active period at any time until just before the close of the season, the shipments are considerably less than they were in 1893. Corn shipments to Buffalo were 24,054,420 bushels in 1894 against 38,466,931 bushels in 1893, and the wheat movement between the same ports was only 10,143,536 bushels in 1894 against 16,669,905 bushels in 1893. Oats also shows a falling off from 17,121,092 bushels in 1893 to 11,954,767 bushels in 1894.

The average lake freight rate for carrying a bushel of corn from Chicago to Buffalo in 1894 was 1.19 cents, which is by far the lowest rate ever made; in 1893 it was 1.68 cents, and in 1892 it was 2.40 cents. The lowest monthly average in the grain trade this year was in July, when the average daily rate was .9 cents. The highest average was in November, when the daily average was 1.3 cents. This is not counting December, when the average was 2⅞ cents, but the December business was abnormal on account of the lateness of the season. The change in the milling industry from the east to the west is manifested in the increase in flour shipments out of Chicago, just as it is shown also in the increased movement from the head of Lake Superior. There is a gain of 600,000 barrels in flour moved from Chicago to Buffalo, and about 100,000 barrels of an increase in the shipments to Erie. Shipments of flour and grain by water during 1894 from Chicago and South Chicago to lower lake ports are shown in the following table:

Chicago to	Flour, barrels.	Wheat, bushels.	Corn, bushels.	Oats, bushels.
Buffalo	1,642,575	10,143,536	24,054,420	11,954,767
Erie	454,161	1,051,451	1,845,076	315,000
Ogdensburg	29,150	480,683	3,232,084	981,889
Fairport	64,540	.....	127,861	.....
Port Huron	.....	26,694	4,104,997	1,672,153
Kingston	.....	1,366,955	1,191,251	.....
Milwaukee	.....	1,442,564	.....	.....
Oswego	.....	.....	166,000	.....
Midland	.....	.....	212,292	.....
Harbor Springs	.....	.....	12,000	.....
Collingwood	.....	19,000	.....	.....
Other ports	.....	.....	.....	45,023
Shipments, 1894	2,190,385	14,530,883	34,946,981	14,968,832
Shipments, 1893	1,171,000	19,720,775	62,967,955	22,563,294

Lumber Almost Entirely from Lake Superior.

As showing the wonderful change in the lumber carrying business from Lake Huron to the new districts of Lake Superior, the following figures will prove interesting:

	1894.	1893.
Shipments from all Lake Superior ports through St. Mary's Falls canal	722,788,000 feet.	588,545,000 feet.
Shipments from Bay City and Saginaw	178,059,011 feet.	173,540,007 feet.

The shipments from Lake Superior are four times those of the Saginaw district. Of course, it is well known that Bay City and Saginaw have become manufacturing districts, and they are each year increasing materially their rail shipments of manufactured lumber, much of the rough material for their mills being imported from upper lake points and from the Canadian shores of Lake Huron, but the figures above will tend to indicate the great volume of Lake Superior business, to which the attention of owners of lumber-carrying vessels is now and must in the future be directed. These figures have no reference to the local business between Lake Michigan ports and Chicago.

Of the total of 178,059,017 feet of lumber shipped by water from the Saginaw district, 151,070,017 feet was from Bay City and 26,979,000 feet from Saginaw. Bay City also shipped 12,011,000 pieces of shingles and 5,890,000 pieces of lath. A feature of the Bay City shipments is the movement of 19,005,000 feet of lumber from that port to Chicago in 1894, against 1,300,000 feet in 1893.

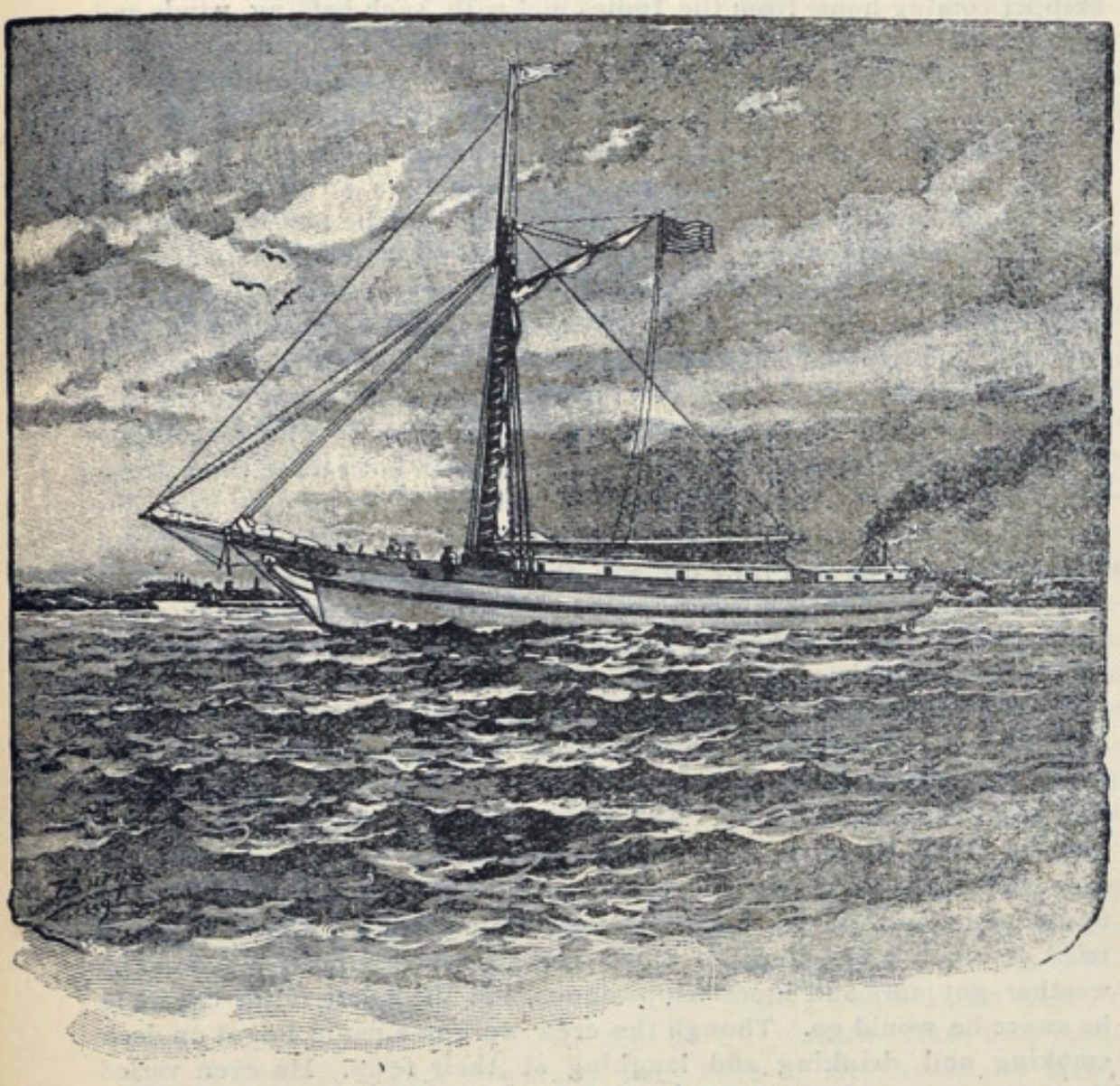
Ports to which Bay City lumber shipments were forwarded in 1894 are: Cleveland 35,362,132 feet, Tonawanda 31,051,147, Toledo 23,076,000, Buffalo 22,080,000, Chicago 19,005,000, Erie 5,981,000, Sandusky 4,604,738, Detroit 4,195,000, Black Rock 2,965,000, Fremont 920,000, Lorain 600,000, North Tonawanda 550,000, Windsor 480,000, Fairport 260,000; total, 151,070,017 feet.

Ports to which Saginaw lumber shipments were forwarded in 1894 are: Tonawanda 7,698,000 feet, Buffalo 6,175,000, Cleveland 5,811,000, Chicago 4,283,000, Black Rock 2,300,000, Black River 560,000, Port Huron 150,000; total, 26,977,000 feet.

"SAILING DIRECTIONS FOR LAKE SUPERIOR, ST. MARY'S RIVER AND STRAITS OF MACKINAC" IS A PUBLICATION JUST ISSUED BY THE UNITED STATES HYDROGRAPHIC OFFICE. IT IS FAR IN ADVANCE OF PUBLICATIONS OF THE COAST PILOT KIND. PRICE $1. ADDRESS MARINE REVIEW, 516 PERRY-PAYNE BUILDING, CLEVELAND, O. WE HAVE NO HESITANCY IN RECOMMENDING THIS BOOK.

Pioneer Lake Propeller.

A few of the older vessel men will recognize in the accompanying engraving the first propeller to navigate the lakes—the Vandalia built at Oswego in 1840-41. The engraving is taken from Cassier's Magazine, in which there is now being printed a series of articles by William Conant Church, editor of the Army and Navy Journal, on the life of John Ericsson. The Vandalia was the first boat to which Ericsson's propeller was fitted in this country and she was among the first screw steamers of the world. Thomas Fitzpatrick of Cleveland, managing owner of the steamer George T. Hope and consort Fitzpatrick, recalls many strange incidents connected



VANDALIA—PIONEER LAKE PROLELLER.

with the first appearance of this vessel on Lake Ontario in November, 1841, and with Tom Coe of the Cleveland City Forge and Iron Company and other pioneers in the lake trade, he was sometime ago engaged in collecting data regarding the Vandalia and other early steamboats. The Vandalia was built during the period when Ericsson was engaged in trying to introduce steam into the United States navy. She was the first of forty or more vessels to which his screw-propellers had been applied between the years 1840 and 1843. Her engines, Mr. Fitzpatrick says, were constructed in the Auburn (N. Y.) penitentiary.

From the Engineer-in-Chief of the British Navy.

All the English shipping journals are commending very highly a paper on the "Machinery of War Ships," by A. J. Durstin, engineer-in-chief of the British navy, which was read recently at a meeting of the British Institution of Civil Engineers. From the favorable comment that has attended the publication of the paper, it would seem that builders of marine engines for both merchant and naval vessels in this country would do well to secure a copy of it. It is referred to as a history of engineering progress of the British navy during the past ten or twelve years—years which have been more prolific as regards engineering advance than the twenty immediately preceding them. The great value of the paper is said to be not so much in any new theories or proposals enunciated in it, as in the enormous mass of facts which it tabulates and renders available for reference. Copies of the paper can propbably be secured through Mr. Durstin or the British Institution of Civil Engineers.

On the subject of water tube boilers the engineer-in-chief refers to the action of the government in adopting boilers of the Belleville type for the big first-class cruisers Powerful and Terrible, and gives out what is probably the first information of an official kind in this regard. Reference is first made to boilers of the Thornycroft type fitted in the torpedo gunboat Speedy, and a comparison made with other vessels of the same type having locomotive boilers, The Speedy's boilers weigh 107.2 tons, the average of the other seventeen vessels giving 124.4 tons; and the machinery is 212 tons, against 211 tons. The grate area is 204, against 171; the heating surface 17,700, against 6,204 square feet. With 0.5 inch air pressure the natural draught power was 3,046 I. H. P., against 2,631 I.H.P. with 0.8 inch; and with 1.7 inches 4,703, against 3,665 I. H. P. with 2.2 inches. Under forced draught the power was equal to 22.1 I. H. P. per ton of machinery complete, against 17.3 and 43.9 I. H. P. per ton of boilers, against 29.5 I. H. P. in the locomotive boiler gunboats. The power per square foot of grate was 23, against 21.4, and the heating surface per I. H. P. 3.7, against 1.7 square feet. There is therefore, Mr. Durston pointed out, a material increase in the horse power per ton of machinery and boilers. "As regards the working capabilities of this type of boiler," he says, "immunity from leaky tubes,the readiness with which the steam can be raised, and the absence of all special precautions in their stoking are points in their favor; on the other hand, the small quantity of water in them and the rapid evaporation entail considerable attention in feeding; further, their steam space is not great, and care has to be taken to avoid priming. The small diameter of the tubes precludes the use of salt water for feed, and, further, these boilers exhibit a greater disposition than the water tank boilers to prime if any cause gives rise to it." In the Sharpshooter, boilers of the locomotive type have been removed and replaced by eight Belleville water tube boilers.

It cannot be said that any increase in indicated horse-power per ton has accrued on this account, but an advantage as regards ability to continuously maintain a high power is shown, arising more particularly from the fact that there are no tube ends to choke up as in the other type of boilers, and that the whole of the fireside of the heating surfaces is readily cleaned when under way. An increase in weight is involved by the installation of the water tube boilers above that of the boilers at first fitted; but these latter never generated satisfactorily the required power even on trials when new. A more just comparison might be instituted between the results and those of the latter vessels of the class in which the boilers have been increased in size and modified in other ways, in order to enable them to attain their intended power satisfactorily. Compared in this way, the boiler weights do not exceed those of the locomotive type. Little or no forcing was resorted to in obtaining the power recorded—3,238 I. H. P. with 0.1 inch air pressure. In view of the ability of these boilers to maintain a high rate of steaming for considerable periods, and their tactical and other advantages, it was decided to fit them in the two first-class cruisers, Powerful and Terrible now building. Referring to the torpedo boat destroyers, Mr. Durstin showed that with the Thornycroft boiler, installation weighing 48.5 tons, the indicated horse power per ton was 88.6 in the Daring; with the Yarrow boiler, the installation weighing 44.8 tons, the indicated horse power per ton was 86.7 in the Hornet; and with the Normand boiler, the installation weighing in all 50.7 tons, the indicated horse power per ton was 88.7 in the Ferret.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on Dec. 8, 1894:

	Wheat, bu.	Corn, bu.
Chicago	25,955,000	1,594,000
Duluth	6,177,000	.....
Milwaukee	750,000	.....
Detroit	1,344,000	18,000
Toledo	3,234,000	662,000
Buffalo	4,950,000	527,000
Total	42,410,000	2,801,000

At the points named there is a net increase for the week of 2,999,000 bushels of wheat and 387,000 bushels of corn.

The Life Saving Service.

In his annual report, covering the operation of the United States life saving service during the fiscal year ended June 30, 1894, Superintendent Kimball says the establishment embraced at the close of the year 247 stations, 182 being on the Atlantic, fifty-one on the lakes, thirteen on the Pacific, and one at the falls of the Ohio, Louisville, Ky. The number of disasters to documented vessels within the field of the operations of the service during the year was 380. There were on board these vessels 4,054 persons, of whom 3,993 were saved and sixty-one lost. The number of shipwrecked persons who received succor at the stations was 658, to whom 1,501 days' relief in the aggregate was afforded. The estimated value of the vessels involved in the disasters was $6,913,635 and that of the cargoes $2,976,975, making a total value of property imperiled $9,890,610. Of this amount $7,688,170 was saved and $2,202,440 lost. The number of vessels totally lost was ninety-one. In addition to the foregoing there were during the year 214 casualties to small craft, such as sail boats, row boats, etc., on which there were 467 persons, 460 of whom were saved and seven lost.

Of course, the figures given by the superintendent regarding the value of ships and cargoes imperiled, as well as those regarding property saved, are only estimates, but the report as a whole shows the great value of the service.

John McAlpine, who was some time ago engaged as constructing engineer with the Dry Dock Engine Works, Detroit, is now in the bureau of steam engineering, navy department, Washington.

Notes on Steamship Performances.

An eminent foreign shipbuilder of the days of wooden construction once made the remark "that it was impossible to build two ships alike, or even two sides of the same ship," and from an observation of the carrying capacity of what are supposed to be duplicate steamboats, modern ship owners are led to believe that the remark might apply equally well to iron or steel steamships of today. A more apparent discrepancy, and one that touches the pocket-book harder, is that between the cost of operation of duplicate boats fitted with duplicate propelling machinery, or a difference in this respect between boats in which a regard for the difference in dimensions will not account for such discrepency. These differences are not fanciful. They appear in black and whie in the fuel bills. No more are the causes of such differences fanciful, but they are in most cases traceable to some lack of efficiency in the hull or machinery.

Individuals or companies operating several boats annually have at their disposal information as to dimensions and design, and data as to performances, which, if carefully analyzed will result in locating this cause, and the location determines whether or not the difference can be reduced or eliminated. A standard of comparison for boats of all sizes, models and powers is the amount of coal required to carry a ton of freight a mile, and this figure is seen to depend upon the carrying capacity of the boat, fineness of the lines and the efficiency of the machinery. Maximum carrying capacity means full lines. Maximum speed with minimum power and fuel consumption means fine lines, and the efficiency of the hull depends upon the nature of the compromise between the two. Independent of this and the seat of much that we are looking for, is the efficiency of the machinery. Being composed of many parts grouped into boiler, engine, wheel and auxiliaries, all parts so closely related that inefficiency in one part may effect the efficiency of the other parts, as well as simply the aggregate, the machinery of a steamship presents a fertile field for the investigation of the seeming vagaries of steamboat performance. As a suggestion to those who wish to go into this matter, from the trip sheets, fuel bills and indicator cards, it may be noted that it is necessary to first find the cost in coal of each indicated horse power and the effect of indicated horse power in the number of horse powers required to drive the boat a mile; to go further, compare features given below, upon which the cost and effect of the indicated horse power depend:

COST OF INDICATED HORSE POWER DEPENDS ON—

BOILER.

Proportion of grate to heating surface.
Draft
Coal per square foot of grace surface.
Cleanliness.
Temperature of feed water.
Dryness of steam.

ENGINE.

Disposal of energy of steam.
Efficiency of condenser and air pump.

EFFECT OF INDICATED HORSE POWER DEPENDS ON—

Efficiency of hull.

WHEEL.

Efficiency.
Friction.

ENGINE.

Distribution of power.
Uniformity of crank effort.
Friction of engine and shafting.
Efficiency of condenser and air pump.

Having found that certain features in two or more boats are identical, or can with allowances for conditions be made identical, it remains to find the reason for disagreement in the other features and in such reason we should expect to find a clue to that which we are seeking. The plan has the appearance of complexity, but most of the features of effecting economy are obtainable from the ordinary observation of performance and knowledge of the dimension of the parts. Comparison of performances of boats of known dimensions and machinery is the most available and satisfactory means of learning facts and establishing rules concerning marine engineering and the operation of steamships, and the accuracy and number of these facts increases rapidly with the number of performances compared. By such comparisons ship owners can contribute much to the general information on the subject and incidentally to the net earnings of their floating property.

GEO. C. SHEPARD.

The Flying Dutchman.

"Who was the original Flying Dutchman?" asks a writer in Fairplay of London, who has been contributing a series of very interesting articles under the title "Doubling the Cape." The naratives have reached the period ending the Dutch and beginning the English career in South Africa and Fairplay's contributor says it would hardly be right to pass on without taking notice of the strange romance that has for generations lent a weird charm to the Cape of Storms.

"According to one account" he says "the original Flying Dutchman was the captain of a vessel laden with the precious metals homeward bound from the Indies. The plague broke out on board and misery led to murder. One-half the crew were dead or dying when she tried to enter port, but because she was infected and because of the sin on board of her she was refused entry. Port after port were tried in vain, and the vessel was condemned to roam the seas for ever after, unable to find haven or rest."

"Another legend, however, had a more reasonable basis. A Dutch skipper coming home from the Indies met with such baffling winds and tempestuous weather at the cape that he could not round it. He grew wild with the delay, and at the probable loss of market for his valuable cargo, and one day he swore a fearful oath that spite of God or devil he would round the cape, and would not put back, though he had to keep on beating until the day of judgment. He has gone on striving ever since, and though he often succeeds in getting off the cape he never manages to get round the promontory. This is the legend on which Captain Marryat based his well-known novel, and on which Wagner based his opera, but there are several variations of it. In one story, the blasphemous skipper is mortal, and is doomed to roam in a spectral bark until redeemed by the love of a living human being. In another, he must go on beating and blaspheming until brought to tears and repentance by a holy relic presented by human hands. And the spectre ship in both these cases disappears as soon as the Dutchman's soul is redeemed. In another story, the doomed skipper is allowed to return every seven years for a short sojourn among mortals, so that if he can win the maiden love of a pure soul he may be freed from his wanderings. In some of the stories he succeeds and is saved; in others he fails and is left sailing for ever in his hopeless struggle with the winds of Good Hope."

"The name of this Dutchman is not always the same, but very frequently is Vanderdecken, which may be roughly translated as On-the-Deck, where, indeed, the spectral skipper is always seen by mortals when they sight the phantom ship. And he is not always trying to double the Cape of Good Hope, but is sometimes wrestling alternately with that cape and Cape Horn. The original Vanderdecken is supposed to be the figure of a story told by Jal of a wicked Dutch captain who had vainly tried to double the Cape of Good Hope against a head wind. The weather got more and more tempestuous, and the worse it got the more he swore he would go. Though the crew were in a panic he sat on deck smoking and drinking and laughing at their fears. He even varied the monotony of the struggle by pitching overboard two or three of the men who tried to put the ship about. His next performance was to curse God, upon which the spirit communicated to him his doom—that he should go on navigating forever, without putting into port or ceasing for a moment from the strife with the elements, and with nothing but red hot iron to eat and gall to drink. His mission was to be the evil genius of the sea, the torment and punishment of sailors, the portent of storm and tempest and every kind of disaster. He was to be the creator of white squalls and sudden gales—his very appearance to a mortal vessel should turn the food into beans and the wine to vinegar, and if any mortal touched anything from his hand, that mortal should be lost forever. For crew he was given all the lost souls of bad mariners—thieves, murderers, pirates, cowards, wreckers,—who are to toil on with him eternally. The phantom ship of the Flying Dutchman in short was the purgatory of the faithless and idle mariner.

This captain seems to have been a different personage altogether from one Falkenberg, who has sometimes been called the original of the legend. Falkenberg was not a sailor, but a baron, who in a mad fit of jealousy murdered both his wife and his brother, and then fled to the seashore. There he found a boat with a sable mariner in charge, who briefly remarking, 'Thou art expected,' conveyed the baron on board a spectral barque in the offing. With her he sailed away against the wind, and has ever since been beating up with head to north, playing dice with the demon crew for his own soul. He has been wandering now for upwards of six hundred years, which is a much longer time than Vanderdecken has been trying to double the cape.

Considering the part the Dutch had in the opening up of South Africa, it seems natural that they should furnish a spectre for that headland which so terrified the Portuguese and which even now is not dearly beloved of mariners—and long-shore passengers."

Saginaw lumber men who have been greatly disturbed by the imposition in Canada of a duty on boomsticks used in towing logs across Lake Huron from Georgian bay, have reason to expect a remission of the duty imposed in a few cases late in the fall and a change of regulations before the beginning of business next spring. Canadian authorities at Ottawa, who were called upon by a committee from the lumber men, manifested a disposition to set matters right in accordance with the understanding reached at the time of the passage of the McKinley act, that Canada was to impose no export duty on the log rafting business.

Portraits of Lake Captains.

"Commanders of American Lake Steamships" is the title of a handsome photo-gravure comprising quite large portraits of one-hundred and fifty-four captains, any one of whom would be recognized from the portrait. The picture is the work of J. H. Bowles of New York, and including as it does the name under each portrait, as well as the name of the vessel the captain sails, the picture will be a historical one. The big group covers a space of 720 square inches, so that nearly 5 square inches is allowed for each portrait. Leading vessel brokers and captains have purchased copies of it, and no business house that has any vessel trade can afford to be without a copy. It will be mailed to any address by the MARINE REVIEW, 516 Perry-Payne Bldg., Cleveland, O., at the publisher's price, $7. Check or currency must accompany order, but if the picture is not satisfactory and is returned in good order, the money will be refunded. A suitable frame can be placed on it for $2.50 by any local picture framing concern.

Publications.

"The British Fleet" is a concise, well written history of the greatest navy in the world. It was written by commander Charles R. Robinson, who is an editor as well. A valuable feature of the book is the reproductions of paintings numbering about one hundred and fifty, illustrating battles, ships, persons and social customs. The text and illustrations cover the history of the British navy from the sixteenth century down to the present time. It is an excellent volume for a marine library. The price is $3, and it may be had from Burrows Bros., Cleveland, or Macmillan & Co., New York.

The Nautical Almanac for 1895, published by T. S. & J. D. Negus, has been received. It contains tide tables, depths of water for Atlantic and gulf coast parts, table of distances objects may be seen at sea and method for finding distance of an object by two bearings; a list of American light houses, list of life-saving stations in the United States, and other information, all being necessary to anyone taking a vessel to the coast and very interesting to captains of lake vessels who may obtain a copy by writing to the publishers, No. 140 Water street, New York. Incidentally the book has something to say of the Negus log and chronometer.

Lieut. W. H. Beehler, U. S. N., inventor of the solarometer, has issued a thirty-four-page pamphlet descriptive of his invention, which is referred to as the modern navigation instrument. Since his success in securing orders for instruments on several of the leading transatlantic steamers, Lieut. Beehler writes the REVIEW that he will visit the lakes next spring and endeavor to induce owners of large fleets of steel vessels to make a trial of the instrumeni for determining compass errors. Of course he does not expect that his invention will be of as much use here as it is at sea, where it is claimed that latitudes and longitudes may be determined by it at all hours of the day and night, independent of the visibility of the sea horizon. "When I visit the lakes" Lieut. Beehler says "your steamship companies will be duly requested to allow a solarometer to be put aboard one of their ships, and if it should prove by actual use to be as valuable as I claim it to be, I shall doubtless have no trouble in introducing the instrument, as I know it will be to the interest of both masters and owners to make use of it." The address of the Beehler Solarometer Company is 204 West Lexington street, Baltimore, Md.

Denial of a Bad Rumor.

Editor MARINE REVIEW—I have been informed that some parties are reporting that I have said that we picked up broken rivets by the pailful, every time the steamer Selwyn Eddy was caught out in a storm, light. In justice to the Detroit Dry Dock Company and myself, I will say that their report is entirely without foundation. To the best of my belief, neither the Selwyn Eddy nor the E. C. Pope broke as much as a single rivet in a seaway during the two years I was on them, and you have my consent to use this matter as you see fit. I am not looking for any favors, and send this letter to you only in justice to the builders of the boats, the owners and myself.

Lake Huron, Nov. 6, 1894. H. ZEALAND.

Richard P. Joy of Detroit, who takes an active, patriotic interest in the advancement of American shipping, sends the REVIEW a collection of clippings from leading newspapers of the country showing strong opposition to President Cleveland's latest recommendation in favor of the admision to American register of foreign ships owned by Americans. Hon. F. W. Wheeler of West Bay City, who is another of the earnest advocates of protection to American ships, has submitted to the newspapers extracts from a letter showing that negotiations with an eastern company for the construction of three vessels at Bay City that were to go to the coast, were called off by the recommendations of the president in his late message.

PHOTOGRAPHS of sixteen lake steamers and two color plates will be mailed to any address for 50 cents. MARINE REVIEW, Cleveland, O,

Around the Lakes.

A cargo of 108,500 bushels of corn was taken from Toledo to Buffalo by the steamer I. W. Nicholas on her last trip. Although not one of the "whales" in the lake trade, the Nicholas has proven a most satisfactory carrier.

William Livingstone, father of William Livingstone, Jr., and grandfather of W. A. Livingstone, both of whom are well known in vessel circles throughout the lakes, died in Detroit Wednesday. He was in his eighty-third year.

Duncan Robertson, who has been engaged in ship building at Grand Haven since 1867, has decided to discontinue business. Mr. Robertson served his apprenticeship on the Clyde. He is fifty-six years of age, forty-one years of which he has put in at ship yards.

E. E. Roberts of the Roberts Safety Water Tube Boiler Company of New York, a concern that has been successful in applying boilers of the water tube type very extensively to vessels of moderate size, has been visiting lake cities during the past week in the interest of his company.

At the annual meeting in Detroit, Wednesday, of underwriters interested in the publication of the Inland Lloyd's Register, J. J. Clark, of Detroit, was elected president, C. A. Macdonald, of Chicago, vice-president, and A. H. McDonald, of Detroit, secretary and treasurer. Capt. Daniel McLeod was re-appointed inspector.

Vessel owners of Detroit met in the office of Capt. E. M. Peck, Friday, and adopted resolutions fitting to the memory of Capt. John Pridgeon, whose death was announced last week. Capt. Pridgeon was at one time among the largest vessel owners on the lakes. He carried on many successful business enterprises in Detroit and leaves an estate that, although built up from small advantages in early life, will pass the million mark.

The question of regulations for the government of raft towing on the lakes, was re-opened in congress Wednesday by the introduction of a bill embodying the recommendations of the army engineers. Mr. Lockwood, of Buffalo, is the author of the measure, and it will have support of the strongest kind from the vessel owners. A similar bill will be introduced in the senate, and the matter will be closely watched during its coesideration in committees.

Capt. Thomas Wilson and Mr. J. C. Gilchrist are in a position to swap salvage claims. The announcement that one of the Wilson line steamers had picked up the Lackhwanna line steamer Wyoming in a disabled condition had hardly been given out when news of a similar service having been rendered by Mr. Gilchrist's steamer City of Venice to the steamer Spokane, bearing a very valuable cargo, was telegraphed from Lake Michigan. Salvage allowance in either case might undoubtedly be made considerably larger than usual, on account of the service being rendered so late in the season.

The wreck of steamer Burlington, which burned and sank last spring in the Detroit river near Sandwich, Ont., is being raised by U. Grant Grummond of Detroit, for Canadian parties who purchased the sunken hull at a sale ordered by Canadian government officials, after both underwriters and owners had refused to move it. An extended action at law will undoubtedly result from the efforts of the owners of Burlington to recover insurance. They started their boat down the lakes from Bay City early last spring without a full understanding as to the provisions of the policy under which she was insured.

It is estimated, by a commission of government engineers appointed for the purpose, that the cost of dredging out the basin forming the harbors of Duluth and Superior, so as to provide 20 feet of water in channels giving general access to all important points, would be $3,150,533. If appropriations for the work are made continuous, and the whole contract let at once, it is thought this figure may be reduced probably 25 per cent. Such is the report made to congress by the war department. Duluth and Superior were the first lake cities making effort to prepare their harbors for the 20-foot channel. They now have a report from the engineers on the subject, and it is to be hoped that their enterprise will result in the work being undertaken by the government under the continuous contract system, which is the aim of the projectors, but the appropriation is a big one to be assigned to a local improvement, and the representatives of Minnesota and Wisconsin may well be congratulated if they secure it in the next congress.

George G. Hadley, of Toledo, and other leading operators of soft coal mines in Ohio, make no secret of their efforts to effect a combination of mines in the Hocking, Shawnee, Sunday Creek and one or two other districts, for the purpose of restricting production to about 6,000,000 tons and advancing prices. Ruinous competion, it is claimed, has left the business without any profit for several years past. It is true that competition between Pittsburg and Ohio operators, as well as late opposition from the Virginia mines, which have been making extensive shipments into the northwest, has caused the soft coal business to be conducted on very small margins, but all efforts in the past to combine any of these interests have proved fruitless.

MARINE REVIEW

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O.

SUBSCRIPTION—$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,341 vessels, of 1,227,400.72 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons and over that amount on the lakes on June 30, 1894, was 359 and their aggregate gross tonnage 634,467.84; the number of vessels of this class owned in all other parts of the country on the same date was 316 and their tonnage 642,642.50, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1894, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels	1,731	843,239.65
Sailing vessels	1,139	302,985.31
Canal boats	386	41,961.25
Barges	85	39,214.51
Total	3,341	1,227,400.72

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

	Number.	Net Tonnage.
Year ending June 30, 1890	218	108,515.00
" " " 1891	204	111,856.45
" " " 1892	169	45,168.98
" " " 1893	175	99,271.24
" " " 1894	106	41,984.61
Total	872	406,976.28

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

	St. Mary's Falls Canal.			Suez Canal.		
	1893.	1892.	1891.	1893.	1892.	1891.
No. vessel passages	12,008	12,580	10,191	3,341	3,559	4,207
Ton'ge, net regist'd	9,849,754	10,647,203	8,400,685	7,659,068	7,712,028	8,698,777
Days of Navigation	219	223	225	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

ALTHOUGH the Lake Carriers' Association has, through its legislative committee, already committed itself to opposition to any outflow of water from Lake Michigan into the Chicago drainage canal that would materially affect lake levels so as to endanger commerce, it would seem that the vessel owners at their annual meeting in Detroit next month will do well to go slow in taking decided action with reference to this matter. Mr. Gordon H. Nott, a Chicago engineer who is opposed to the drainage canal, was in Detroit a few days ago, and it is announced that he will appear before the vessel owners at their annnal meeting and make some "startling disclosures" as to the effect of the Chicago canal on lake levels. It is understood from what Mr. Nott has already written on this subject that he bases his statements relative to the probable outflow of water from Lake Michigan to the Chicago canal largely on the Niagara river outflow determination made by Major Ruffner, of the United States engineer corps. Now it must be remembered that there are eminent engineers in this country—several of them well acquainted with all engineering work on the lakes—who do not agree with Major Ruffner or the engineer corps as to the correctness of any determination as yet reached on the outflow question, and who have been urging the shipping interests to secure reliable data on the whole subject, in order that matters like the Chicago drainage canal and harbor improvements on Lake Erie, in which the outflow question is important, may be properly dealt with. It must be remembered also that Mr. Nott's object in appearing before the vessel owners is to promote another sewerage system for Chicago in opposition to the drainage canal. It may be all right to have the vessel owners try to secure through the war department government supervision over the matter of the outflow of water to the Chicago canal, but it would seem that they should also seek a settlement of the whole lake outflow question through the appointment of an international commission for that purpose, as recommended by the waterways convention held recently at Toronto. They should not be led to outright antagonism of a work so important as the Chicago canal, through whatever Mr. Nott may say on the basis of Major Ruffner's determination at Niagara.

Major Ruffner's conclusions have several times been publicly attacked by Mr. Geo. Y. Wisner of Detroit, who is an engineer of high standing, and only recently Mr. Wheeler, superintendent of transportation for the Cleveland chamber of commerce, called attention to these criticisms, but no answer was brought out from Major Ruffner or any other member of the engineer corps. Another engineer of considerable experience on the lakes now writes the REVIEW, as a result of the announcement that Mr. Nott is to appear before the vessel owners. "I am satisfied" he says, "that Major Ruffner and his assistant, Mr. Quintus, were well aware when they wrote their official report of the Niagara outflow that it was absolutely worthless,—if I can read their report correctly. If you will refer to page 4,371, Part 6 of 'Report of Chief of Engineers for 1893,' you will find near the middle of the page a new formula, which has been added since the report was printed in the Engineering News of March 2, 1893. Just below the formula on page 4,371, you will find a table of computed discharges for giving gauge readings. For 3.0 feet on local gauge the discharge is computed to be 263,000 cubic feet. Now look in the third line from top of same page and you will find for the same gauge reading that the discharge computed by original formula is given as 241,468 cubic feet, a difference of over 21,000 cubic feet. Again, just below the table it is stated that 'near mean lake level the discharge increment is about 21,000 cubic feet per second.' The original formula (see page 4,368) makes this increment only 14,800 cubic feet, etc., etc. When an engineer derives two formula from the same set of observations, from which the computed results are widely discrepant, and calls them correct, there is something amiss. I note also that Major Ruffner in the letter which was published in the REVIEW of Nov. 8 uses results from his original formula, probably for the reason that they make a more damaging showing against the Chicago canal."

THERE is nothing surprising in the fact that United States vessels on the lakes carried during the past season about 90 per cent. of 8 500,000 bushels of Manitoba wheat that was shipped east from Port Arthur and Fort William, Canadian shipping ports at the head of Lake Superior, to Buffalo. Canada has not the tonnage on the lakes to care for the movement of anything near this amount of grain during the two closing months of the season when the great bulk of the Manitoba crop is moved. The number of Canadian lake vessels fitted for this trade is probably not more than a dozen, none of which are of a size suited to compete with big steel ships of American construction that found a profit in carrying this grain a thousand miles, from Port Arthur to Buffalo, at an average freight of 3 cents a bushel. This is the main reason why the Manitoba crop was not moved by way of the St. Lawrence.

SOME OF the New York papers still insist that the Cramps have a contract with the Russian government for three armored cruisers. The REVIEW some time ago addressed a letter to the Cramps making inquiry regarding the rumors of such a contract, but received no direct answer, although the Philadelphia builders have at all times in the past been very prompt and courteous in such matters. Probably they are willing that free advertising of this kind should fall their way, and then again there may be some truth in the rumors, as it is certain that negotiations between the Cramps and the Russian government for new ships have been pending for some time past.

IT HAS been well said in connection with the announcement, a few days ago, of the death of Ferdinand De Lesseps, that eminent men are exposed to greater temptations to mistake than ordinary mortals. De Lesseps conceived and carried out in the Suez canal the grandest work of the century, and although committing a blunder equally great, that resulted in scandal-mongers bitterly vilifying his name and reputation, his memory should be preserved for this great achievement.

Life on an Ironclad at Sea.

Admiral von Werner, a high authority in naval matters in Germany, describes in a work recently published the behavior of armor-plated men-of-war in a heavy sea. He says: "Even with a moderate gale and sea, an armor-plated cruiser, if going against the wind, will find herself in conditions similar to those of a storm—at least the crew will have that impression. The movements of the stern of the ship are violent and exceedingly disagreeable. The waves, pushed by the advancing prow, sweep continually over the ship from bow to stern. All windows and portholes must be closed, and air reaches the lower decks, where the heat increases unbearably, only through the artificial ventilators. With the exception of the specially protected command bridge, all the uncovered portions of the ship are impassable; thus the whole crew must bear as well as they can the hell of the closed decks. On such a ship no one can feel comfortable; and when there is a storm in which a sailing ship would feel comparatively at ease, the crew of an armor-plated ship imagines itself to be in a heavy hurricane which threatens destruction at every minute. The long, narrow forepart of the ship, which is not borne lightly by the water, and is rendered extremely heavy by the mighty ram and the armored deck and the cannon and torpedoes, forces the ship in a high sea to pitchings and rollings of such an extraordinary kind that they cannot be described. The crew of such a ship is not only exposed to mortal danger, but the voyages they make render them physically extremely and dangerously nervous; the mental impressions they receive wear them out and make the profession hateful.

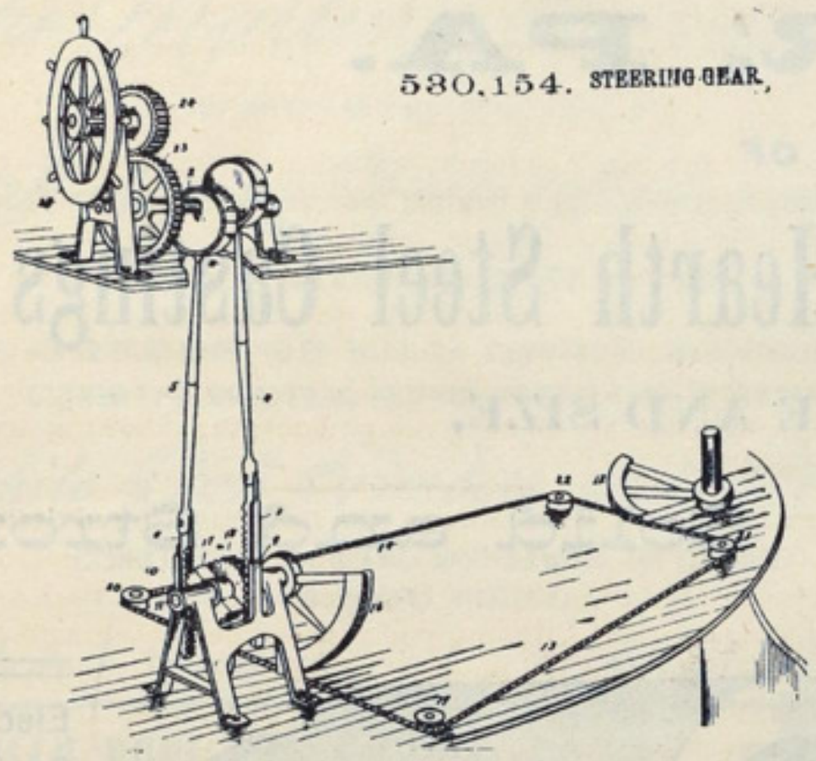
Illustrated Patent Record.

SELECTED ABSTRACTS OF SPECIFICATIONS OF A MARINE NATURE—FROM LATEST PATENT OFFICE REPORTS.

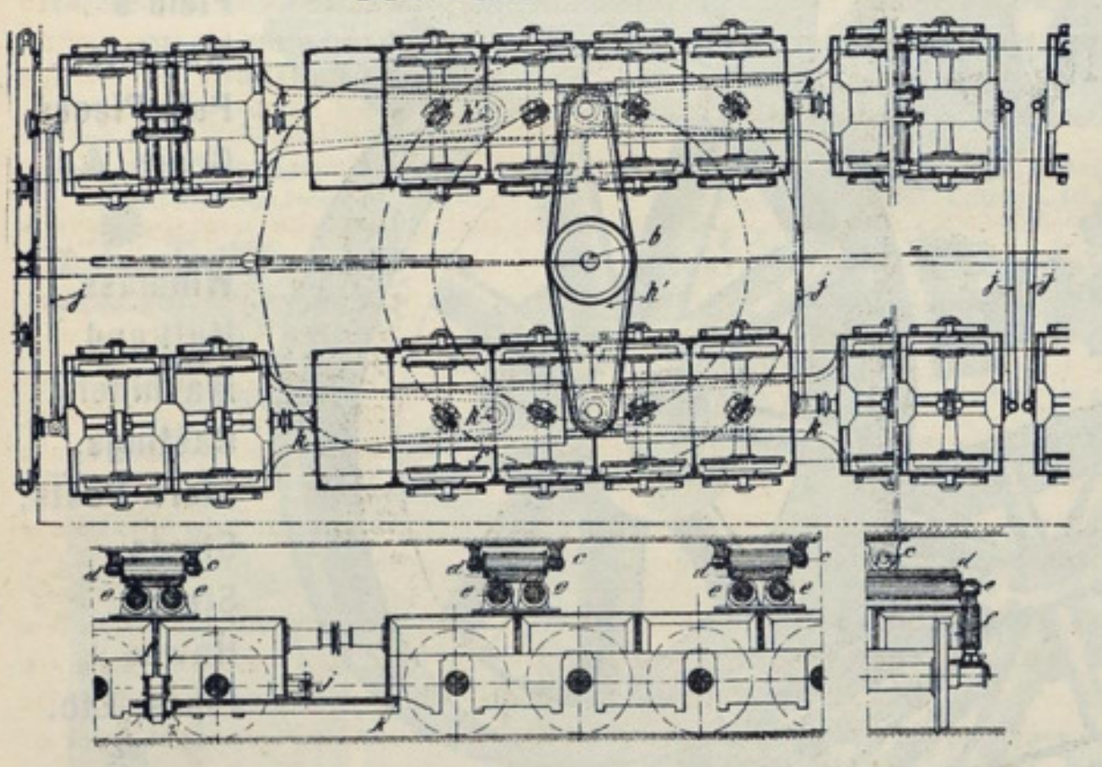
530,154. **Steering Gear.** John E. Allen, Detroit, Mich. Filed Mar. 22, 1894. Serial No. 504,605.

Claim. In a steering gear, the combination of an axle and means for turning the axle, a pair of eccentrics, set with their centers to form an angle with the axis of the axle upon which they are set, racks actuated by the eccentrics, and pinions actuated by the racks, and means for transmitting the motion of the rack actuated pinions to the rudder post.

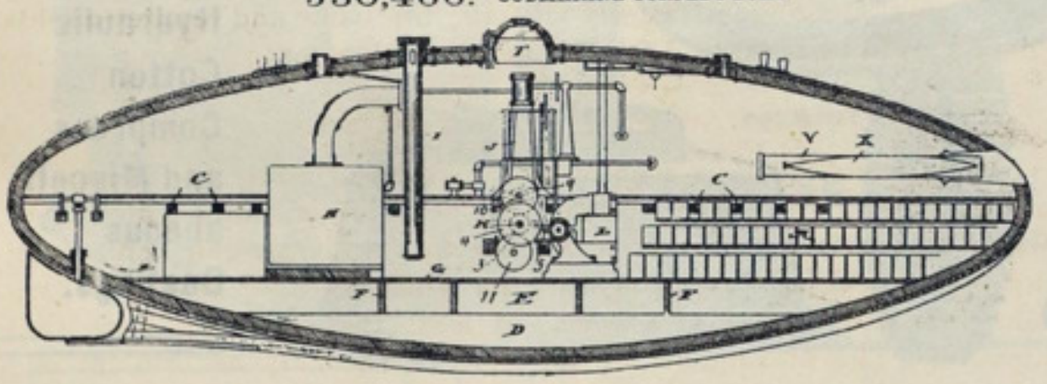
530,154. STEERING GEAR.



530,245. SHIP-RAILWAY



530,466. SUBMARINE TORPEDO-BOAT



530,245. **Ship-Railway.** Amedee M. G. Sebillot and Frederick Weidknecht, Paris, France. Filed Aug. 4, 1892. Serial No. 442,121.

Claim. In a dock for transporting ships and other vessels on railways, the combination with the dock or carrier and with swiveling trucks of intermediate sets of rollers placed at right angles to, and superposed the one set on the other with a plate interposed between them whereby to permit free longitudinal and transverse movements of the trucks.

530,466. **Submarine Torpedo Boat.** George C. Baker, Chicago, Ill.; Mary R. Baker administratrix of said George C. Baker, deceased. Filed Mar. 14, 1893. Serial No. 465,983.

Claim. First, in a submarine boat the combination with its propeller shaft, primary and secondary motors, connections between the said motors, and direct connections between each motor and the said shaft, the combination permitting the accumulation of the secondary by the primary power, and the utilization of either power for operating said shaft. Second, in a submarine boat and in combination with the propeller shaft an engine having direct connection therewith, a dynamo connection between the said engine and dynamo, and between the shaft and dynamo, and a series of storage batteries, the combination permitting the utilization of liquid or electricity as a motive power.

In General.

A preliminary trial of the Ammen ram, now building at Bath, Me., will occur this month. Temporary conning towers are being fitted to the vessel in place of the delayed armored towers.

M. Bazin, the famous French engineer who a short time ago introduced a design of a ship that was to be rolled over the water on a number of cylinders, is having built on this design a steamer of 100 tons.

A canvas of the house of representatives is said to indicate that a large majority of the members of that body will support Secretary Herbert's recommendations for additional battleships and torpedo boats.

G. D. J. Trask, governor of Sailors' Snug Harbor, Staten Island, N. Y., thanks the REVIEW for a considerable number of marine pictures, which were forwarded to the institution a short time ago, and informs us that they will be placed in the portfolio collection of the home.

Notwithstanding numerous reports of a reorganization of the lighthouse board, and a change to army control in the service, Admiral Walker has been appointed president of the board, and the institution will undoubtedly proceed along the lines that have characterized its work for a number of years past.

Since the refusal of Messrs. Maudslay, British manufacturers of the Belleville water tube boilers, to engage in the competitive tests of water tube and Scotch boilers, as proposed by Mr. James Howden, it has been suggested that the matter be taken up by the Institution of Naval Architects or the Institute of Mechanical Engineers.

Here is an item that will give an idea of the cost of maintenance of war ships: On the British turret battle ship Monarch, commissioned twenty-five years ago and lately overhauled and fitted with new machinery, $2,240,000 have been spent for repairs alone. She is of iron, cost $2,400,000 to build, and with her new engines has a speed of from 13 to 14 knots.

Mutual insurance associations in England have from practical experience, covering a long period of years, concluded that steel is superior to iron for the construction of ships, Although this conclusion as an opinion has prevailed for many years, the insurance organizations are only now putting into effect a rule reclassifying their steamers, with a view to reducing the cost of insurance to new steel triple-expansion-engined vessels.

Attention is being given in English shipping journals to another submarine torpedo boat, for which great claims are made. The inventor is Seymour Allen of Sidney. A working model of the boat was tried recently before distinguished naval officers in the public baths at Sidney and the experiments are said to have been a complete success, the model rising, sinking, turning, reversing, or remaining stationary in obedience to the electric current by which it is worked. The inventor claims that a full-sized boat would be capable of remaining under water for three days. It would carry torpedoes on the bow and stern decks.

As numerous contracts for freight and passenger vessels are now being considered by lake ship builders, it is not probable that any of them will make an effort to secure the three torpedo boats for which the navy department is about to let contracts. As it is proposed to build these vessels under either builders' or department plans, a circular with reference to them has been issued in advance of the advertisement calling for proposals. The boats have been described in previous issues of the REVIEW. No premium will be allowed for excess of speed, but there will be a penalty of $10,000 per knot for deficiency and the boats may be rejected or accepted at a reduced price if they fall below 23 knots.

A. M. Gordon of No. 10 Ibrox Place, Glasgow, a naval architect, who is engaged as assistant manager with one of the leading Govan ship building firms, has devised a scale, or sliding rule for computing the power required for driving vessels at any rate of speed on the measured mile. It has been carefully designed for triple-expansion single-screw steamers, supplemented by notes carefully calculated, of the percentage of power necessary to allow over or under that given by the scale for vessels propelled by twin-screw, paddle, or ordinary compound engines. The scales are said to be of enough value as to find sale with such firms as William Denny & Bros., A. & J. Inglis, J. & G. Thompson and other leading British builders.

IF YOU SEND $1 TO THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING, CLEVELAND, O., FOR FOUR STEEL ENGRAVINGS OF U. S. WAR SHIPS, ON HEAVY CARD, AND ARE NOT SATISFIED WITH THEM, WE WILL REFUND THE MONEY.

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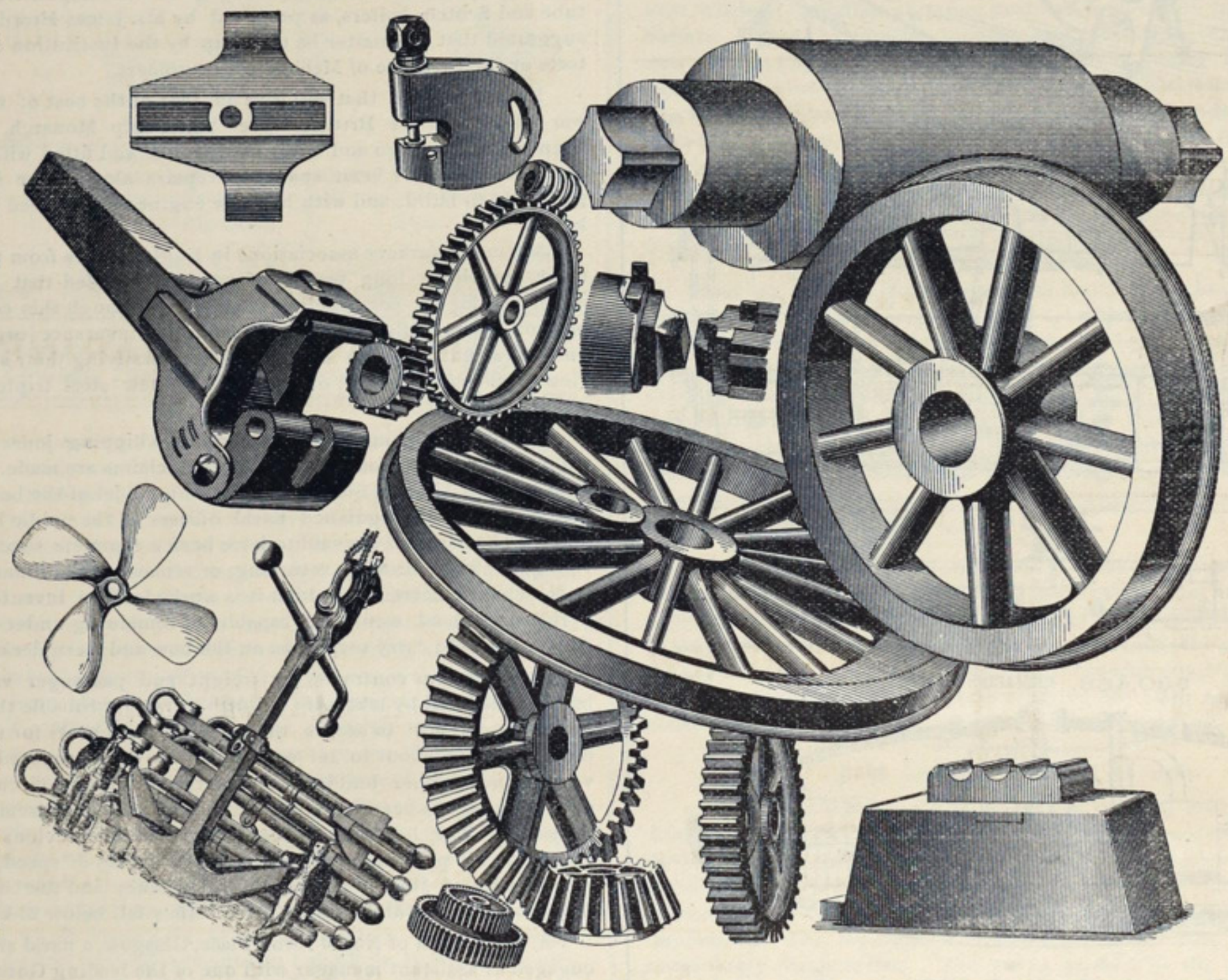

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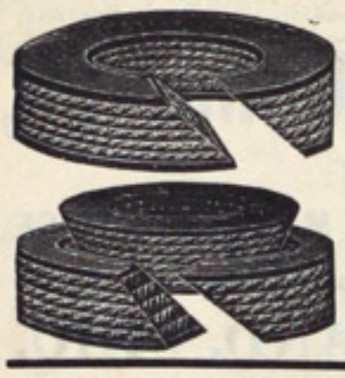

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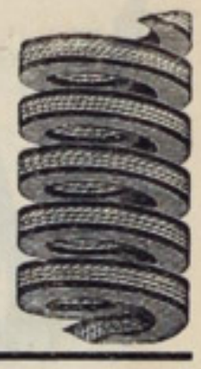

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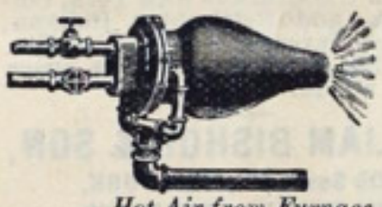

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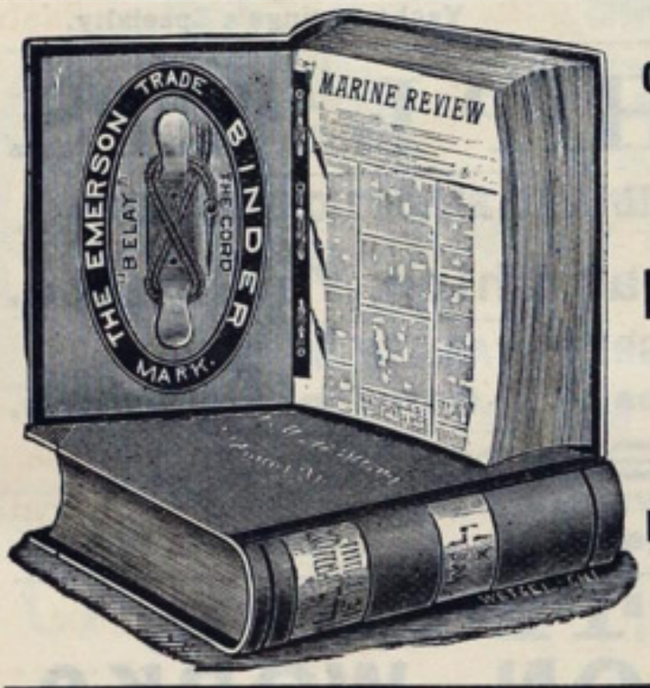

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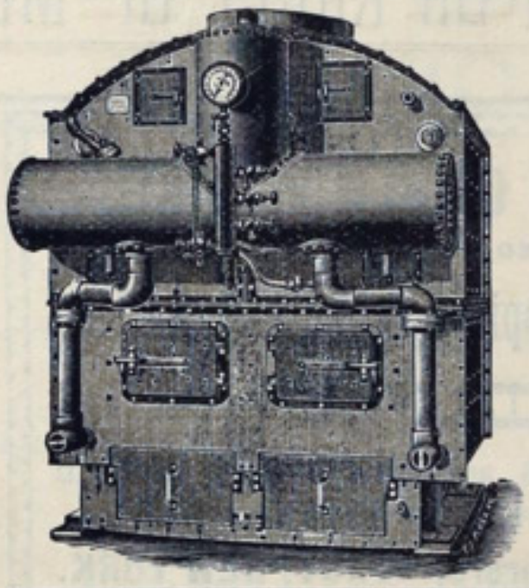

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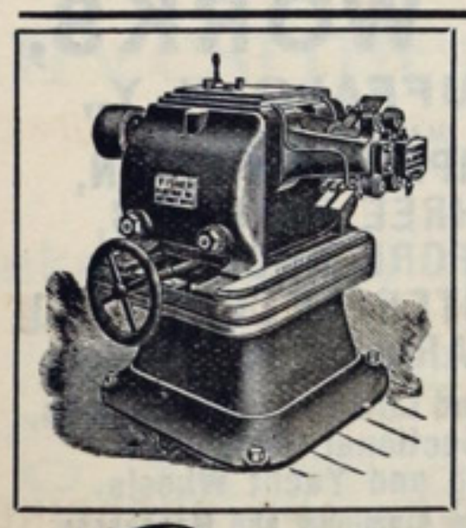

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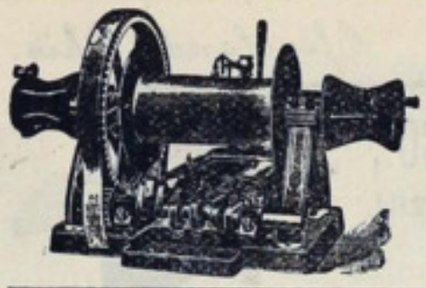

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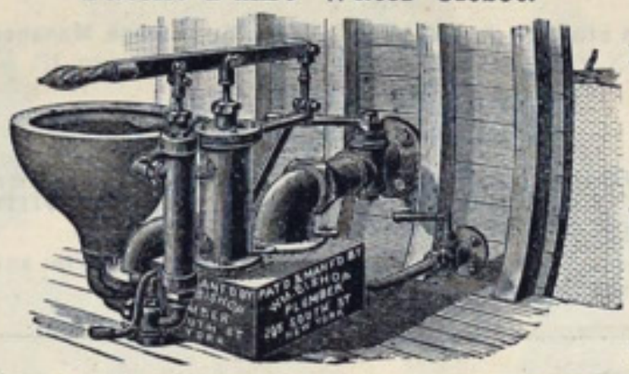

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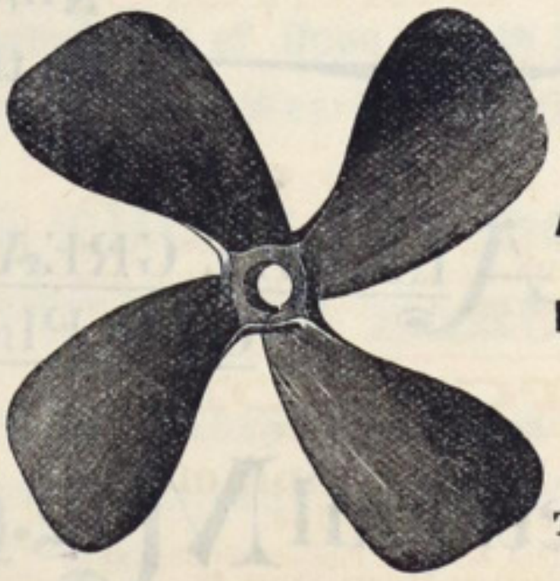

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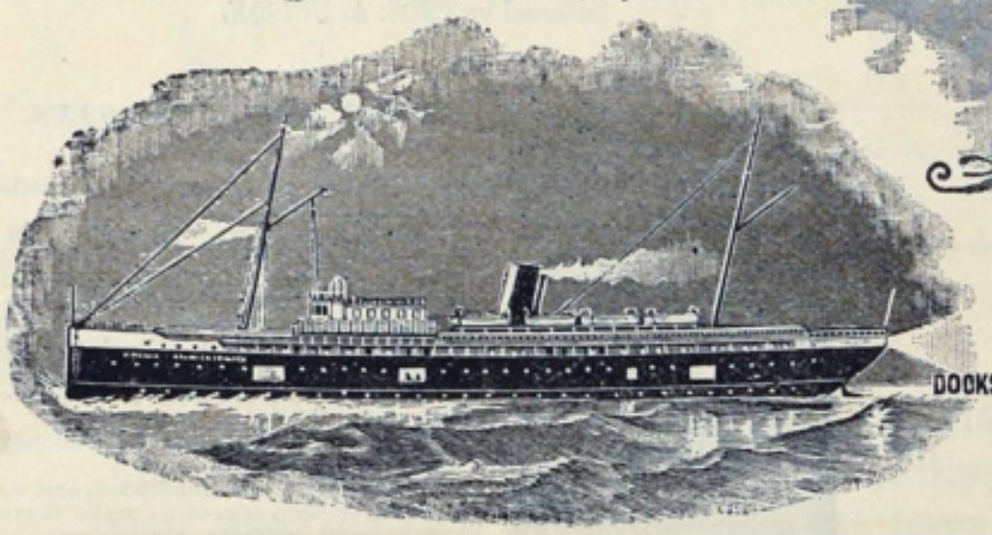

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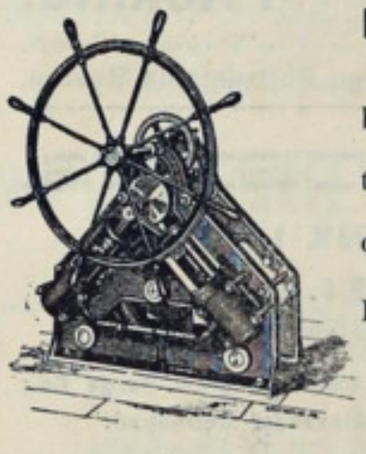

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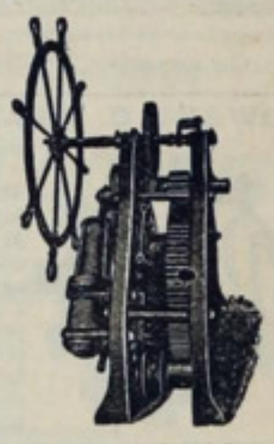

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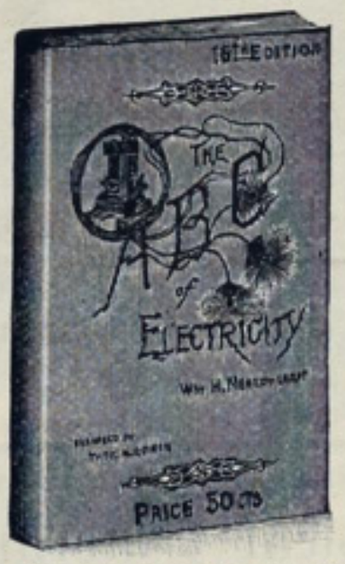

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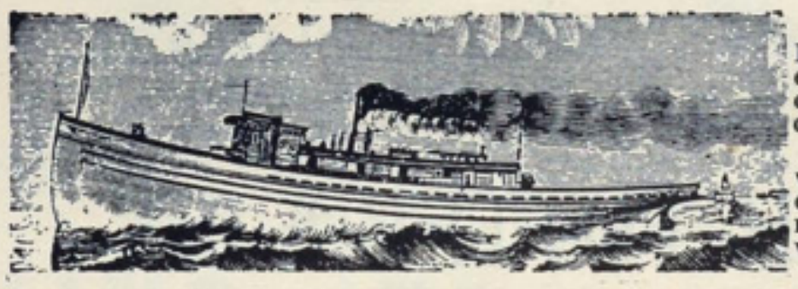

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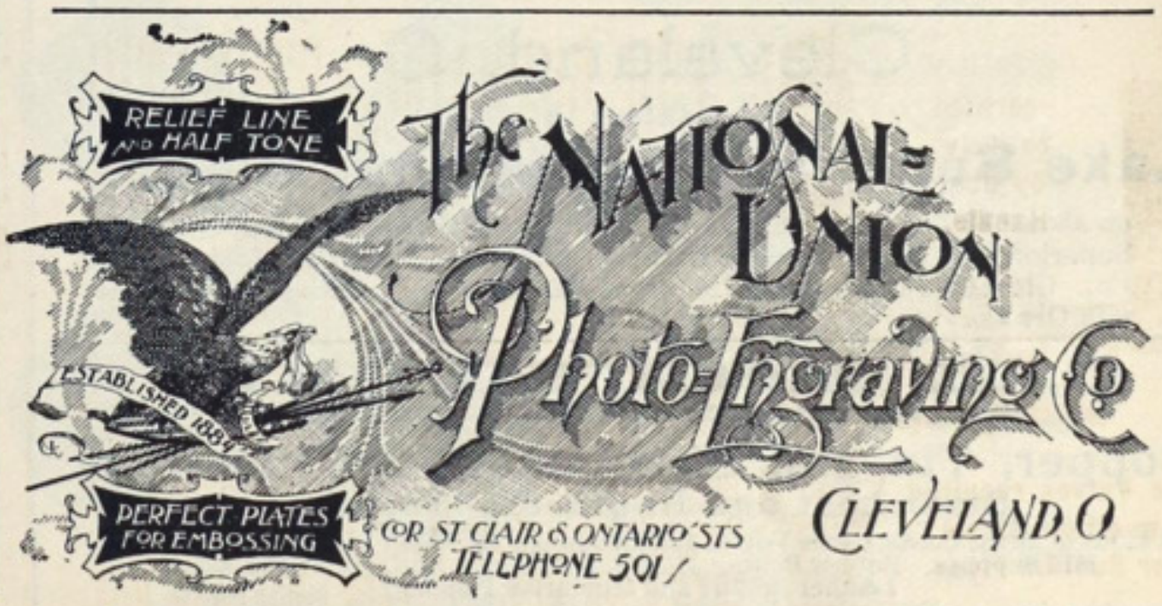

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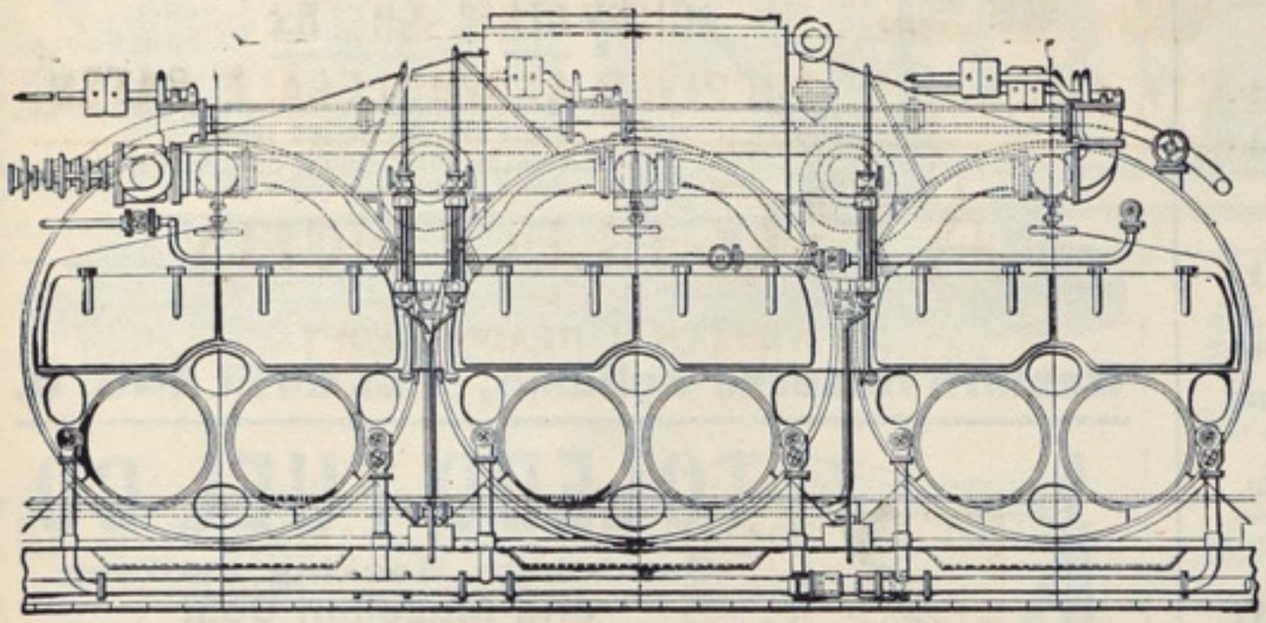

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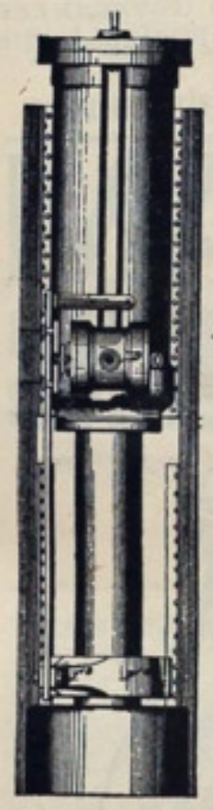

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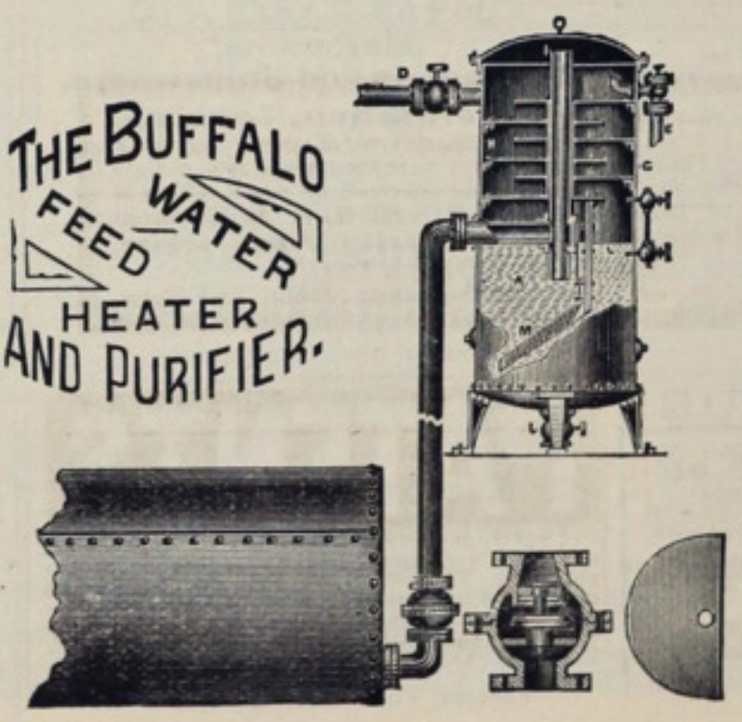

REFERENCES.

A.—Settling chamber.
B.—Boiler.
C.—Feed pipe to boiler.
D.—Steam pipe.
E.—Water supply pipe.
F.—Check valve.
G.—Spray disks.
H.—Spray chamber.
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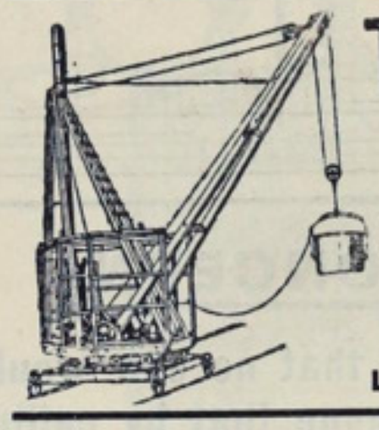
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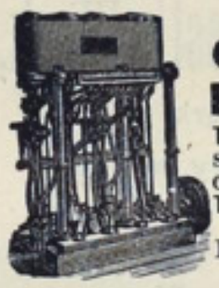
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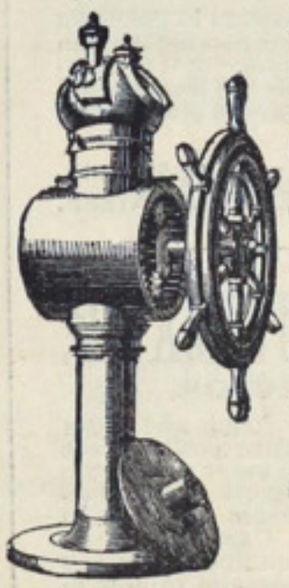
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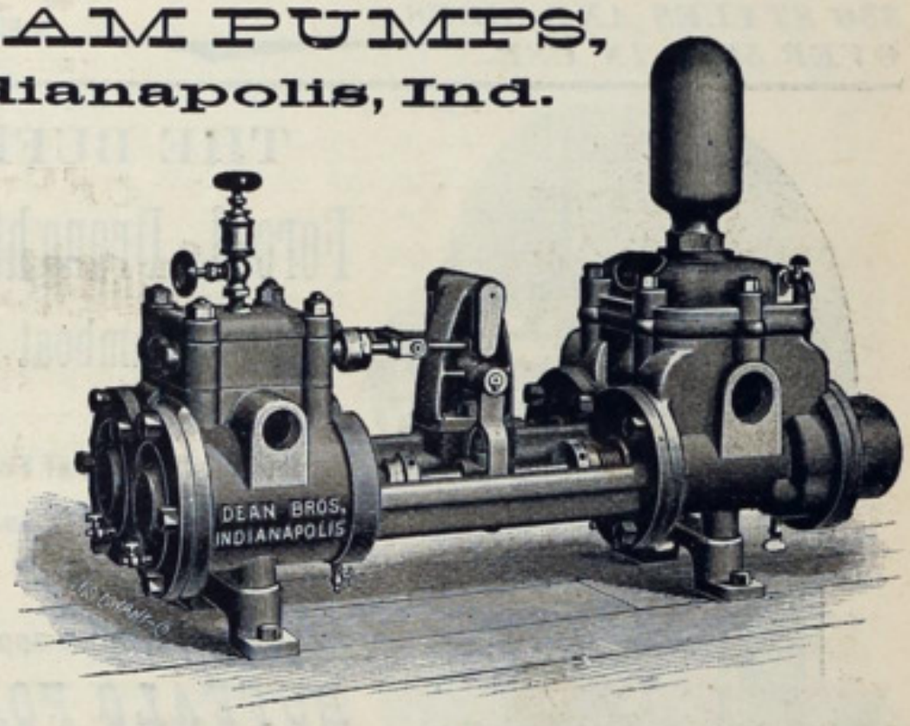

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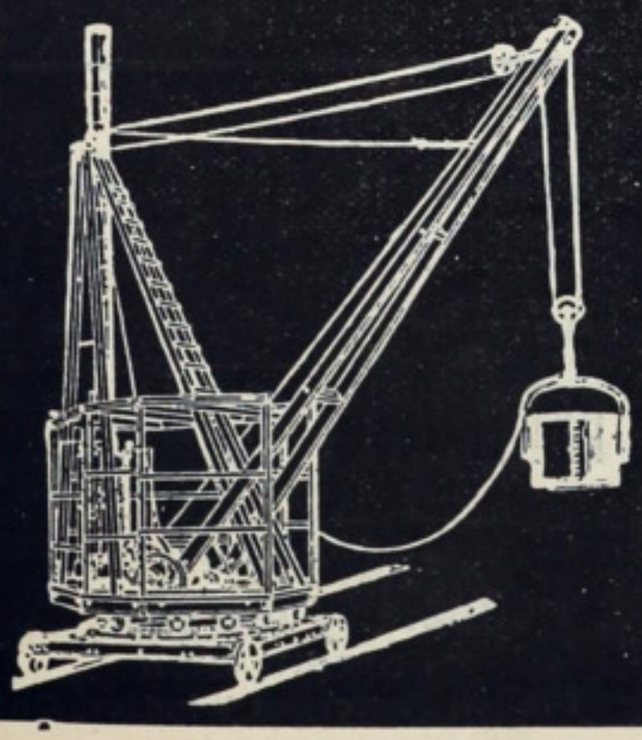

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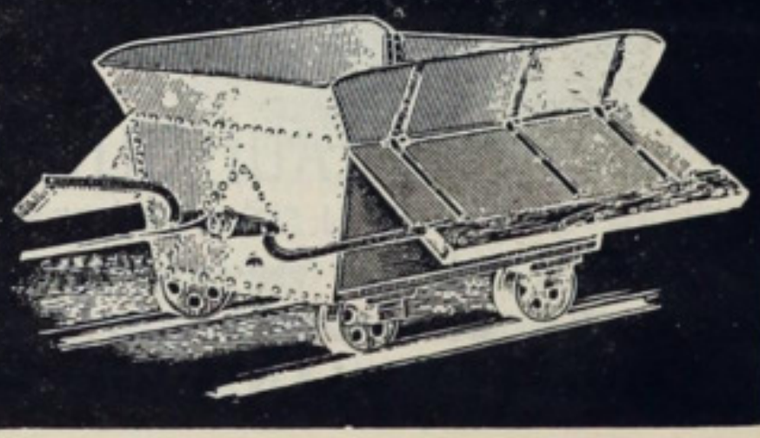

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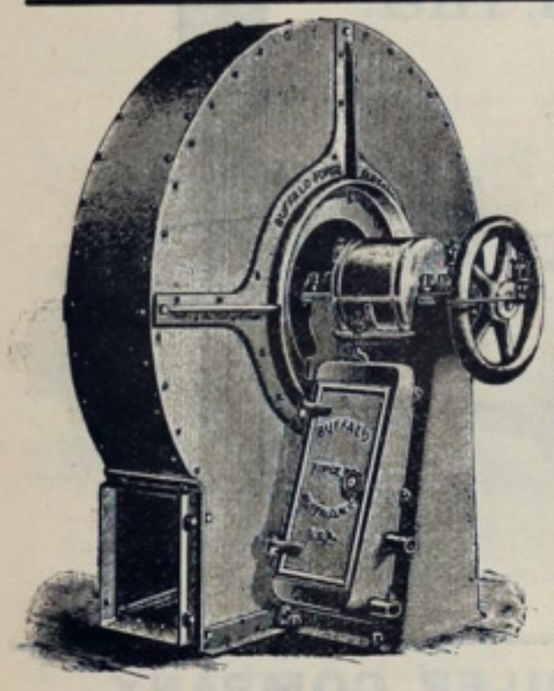

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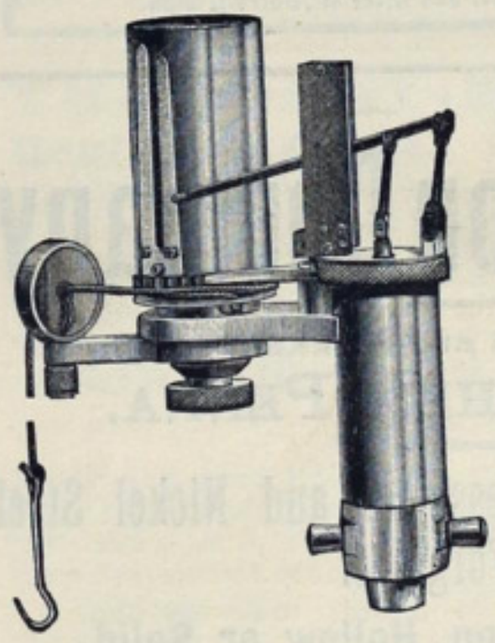

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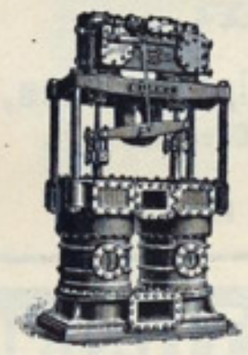

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